

VISIT...

LANZAROTE
Caliente.COM

Benjamin Libet

Can Conscious Experience Affect Brain Activity?

The chief goal of Velmans' article (2002) is to find a way to solve the problem of how conscious experience could have bodily effects. I shall discuss his treatment of this below. First, I would like to deal with Velmans' treatment of my own studies of volition and free will in relation to brain processes.

Unconscious Initiation and Conscious Veto of Freely Voluntary Acts

Velmans appropriately refers to our experimental study (Libet *et al.*, 1983) that found that onset of an electrically observable cerebral process (readiness potential, or RP) preceded the appearance of the subject's awareness of the conscious wish to act, by at least 350 msec. That indicated that the volitional process is *initiated* unconsciously. Velmans uses the term preconscious instead of unconscious. But, in fact, subjects have no reportable awareness or intuitive feeling that the brain has started a process before their conscious wish/urge to act appears. Unconscious initiation of the voluntary process appeared to mean that conscious free will could not actually 'tell' the brain to begin its preparation to carry out a voluntary act.

However, our experimental observations also showed that the conscious wish to act (W) preceded the final motor act by about 200 msec (or 150 msec when corrected for a -50 msec bias in the reporting process). That provided an opportunity for the conscious will to control the outcome of the volitional process. It could do that by providing a possibly necessary trigger for the process to proceed to completion in a motor act; there is, however, no evidence for such a mechanism. Or, the conscious will could block or 'veto' the process, resulting in no motor act (Libet, 1985).

The existence of a potentiality to veto is not in doubt. Everyone has experienced having a wish or urge to perform an act, but vetoed the actual performance of the act. That presumably occurs when a given W is recognized as being incompatible with social acceptability and with one's personality.

Correspondence: Benjamin Libet, 809 Plum Lane, Davis, CA 95616-3219, USA.

In his footnote number 4, Velmans discusses the veto or ‘censor’ potentiality. But he raises an obvious question: Why doesn’t the veto decision have its own unconscious antecedents, just as appears to be the case for W itself? If the veto were developed by preceding unconscious processes, that would eliminate *conscious* free will as the agent for the veto decision.

Velmans recognizes that I have argued that the veto need not be decided by preceding unconscious processes (Libet, 1999). The conscious veto is a *control* function, different from simply becoming aware of the wish to act. The *content* of the awareness of the volitional urge to act could include a conscious content of factors that may affect the conscious veto decision. However, the conscious *decision to veto* could be made without direct specifications for that decision by the preceding unconscious processes. Such a view of the veto allows genuine conscious free will to be a *controlling* agent in the performance of a voluntary act, even though conscious free will appears not to *initiate* the volitional process.

Velmans cites what he believes is evidence that bears on this issue. He states that Karrer *et al.* (1978) and ‘Konttinen & Lyytinen (1993) found that *refraining* from irrelevant movements is associated with a slow *positive-going* readiness potential’ (Velmans, 2002, p. 10, fn 4). However, a careful reading of those articles indicates that their evidence is *not* directly relevant to the veto issue.

The paper by Konttinen & Lyytinen (1993) studied stabilization of a rifle when aiming it. The visual stabilization related to that task was associated with increased negativity in the EEG, seen over a period of about 8 sec. The motor component of that task was associated with ‘attenuated negativity or increasing positivity’. There was no evidence bearing on the possibility that the positivity tendency was related to inhibition of irrelevant movements. Indeed, it seems likely that the movements in motor stabilization of a rifle were responses to sensory feedback from proprioceptive organs in the muscles and tendons. In any case, the conditions did not involve our kind of veto to block the ability of a voluntary process, initiated endogenously, to produce the motor act.

The paper by Karrer *et al.* (1978) found positive kinds of RPs in pre-adolescent children, elderly subjects and mental retardates. Normal negative RPs were found with subjects 16 to 18 years old. The authors *speculated* that the positive type RPs were associated with inhibition of irrelevant motor activity in producing a non-cued voluntary button press with the thumb. Now, if the positivity reflects inhibition of irrelevant movements producing this quick motor act, how is it possible for the subject to produce any act at all? The recorded positivity occupies the entire period of a second or more preceding the act, in those subjects showing a positive RP. Indeed, the authors themselves raised the ‘intriguing possibility’ that the positivity may reflect a different pattern of the sources of the RP from the normal. This kind of explanation is presented by Deecke *et al.* (1978) for the positive type RPs they described in older subjects (60–69 years old).

Clearly, neither of these references cited by Velmans produced any evidence directly related to a conscious veto of a voluntary process. Their subjects were not asked to inhibit or veto any movements. I therefore conclude that the

conscious veto is a phenomenon that provides an opportunity for free will to act as a *controlling* agent in voluntary action.

The Mental and the Physical

Mental phenomena, including conscious experience, cannot be observed by the most complete inspection of the physical brain. Subjective experience is accessible only to the individual who has it (the so-called first-person view). Reports of a subjective experience can, of course, be correlated experimentally with specific neural activities in the brain. Believers in physicalism are confident that completely adequate correlations will eventually be discovered, but that remains a theoretical belief. There is some evidence that a full correlation may not occur; i.e. there may be conscious mental events that appear to occur not tied or based upon neural events (Libet, 1994; 1996; 1999).

Velmans tries to solve the paradox of first-person introspective subjective experience based fully on the external observations of the physical brain. He does this by invoking a principle of complementarity. In this, the mind is ‘not’ *either* physical or conscious experience, it is at once physical *and* conscious experience.

This view would appear to be a version of *identity theory* (see Pepper, 1960). In this, there is a single substrate (for the brain in this case), which exhibits an ‘inner quality’ (accessible only to the individual) and an ‘outer quality’ (observable physically to an external observer). There is no way of knowing what the ‘substrate’ is, and it is difficult to explain how both such qualities can be exhibited by the same substrate. Velmans offers some analogies for complementarianism, but these involve two different *physically* observable phenomenon. This doesn’t solve the unique nature of the ‘mind–brain’ relationship, in which one feature is conscious subjective experience that cannot be observed by any external physical means.

Libet (1994) proposed that a *testable* conscious mental field (CMF) could emerge from appropriate cerebral functions. The CMF would unify conscious experience (that is based on an immense number of different neural events), and the CMF is postulated to be able to affect certain neural activities that would provide an avenue for the action of conscious will on the brain. I shall not, here, repeat the full proposal and the experimental design for testing it (see Libet, 1994).

Is Mental Causation Real?

Velmans recognizes that, empirically, mental functions appear to control many actions mediated by the brain. He also accepts our finding that the brain can initiate a volitional process well before the appearance of the awareness of the wish (W) to perform the act (Libet *et al.*, 1983). But, argues Velmans, the delay for W ‘does not argue against the voluntary nature of that preconscious process. On the contrary, the fact that the act consciously feels as if it is voluntary and controlled suggest that the processes which have generated that experience *are* voluntary

and controlled. . . .’ He then states, ‘I assume that such processes operate according to determinate physical principles;’ we have ‘a form of biological determinism that is compatible with experienced free will’ (Velmans, 2002, p. 20).

On the other hand, Velmans notes, in his appendix, that physicalism ‘is partly an expression of faith, based on precedents in other areas of science’ (p. 22). Velmans also agrees that neural correlates alone would not tell us how conscious experience arises. I agree with both of these propositions (Libet, 1973; 1993; 1994; 1996; 1999), as do others (e.g. Chalmers, 1996).

So, what can we make out of all this? Velmans points out that a physical reductionism, that proposes the conscious experience is identical with neural activity, is not acceptable. Yet, he assumes that the processes giving rise to conscious experience follow deterministic physical laws. Velmans then offers the view that the unconscious neural processes that lead to a conscious wish to act could be regarded as an expression of free will, because we *feel* that we have free choice and control over the act.

Clearly, such a view does not represent a genuine free will. The voluntary act is, in this view, not free of the inexorable adherence to deterministic physical processes. In this view, the feeling of an independent freedom of choice and control is merely an *illusion*.

Emergent and Conscious Experience

Roger Sperry (1980) had proposed that the mind is an emergent property of suitable brain functions, with special attributes not evident in the neural activities within the system, the brain. Among these attributes, Sperry included an ability of the conscious mind to supervene in certain neural activities. Initially, Sperry believed that the whole system obeyed the deterministic physical laws. But in his later years, he concluded that one had to invoke the possibility that the conscious mind could control certain neural functions in a way that was independent of the physical laws (Doty, 1998).

Libet (1994; 1999) took these views a critical step further. He proposed that the emergent conscious experience be represented in a field, the *conscious mental field* (CMF). The CMF would unify the experience generated by the many neural units. It would also be able to affect certain neural activities and form a basis for conscious will.

The CMF would be a new ‘natural’ field. It would be a nonphysical field, in the sense that it could not be directly observed or measured by any external physical means. That attribute is, of course, the well-known feature of conscious subjective experience, which is only accessible to the individual having that experience.

In contrast to other proposed theories of conscious functions, Libet (1994) presented a fully detailed experimental design for testing the CMF theory. The CMF theory is outrageously radical, in that it proposes a mode of intracerebral communication they can proceed without requiring neural pathways. But, as Niels Bohr remarked, a theory that is not bizarre has no chance of providing a

breakthrough advance. My hope is, therefore, that a qualified neuroscientific group will perform the difficult experimental test outlined in Libet (1994).

In any case, the CMF theory provides a ‘mechanism’ that fits the known properties of conscious experience, including that of conscious free will. It is not dualism, in the Cartesian sense; the CMF does not exist without the living brain, and is an emergent property that brain.

References

- Chalmers, D.J. (1996), *The Conscious Mind* (New York: Oxford University Press).
- Deecke, L., Englitz, H.G. and Schmidt, G. (1978), ‘Age-dependence of the Bereitschaftspotential’, in *Multidisciplinary Perspectives in Event-Related Potential*, ed. D.A. Otto (Washington DC: US Government Printing Office).
- Doty, R.W. (1998), ‘The five mysteries of the mind, and their consequences’, *Neuropsychologia*, **10**, pp. 1069–76.
- Karrer, R., Warren, C. and Ruth, R. (1978), ‘Slow potentials of the brain preceding cued and non-cued movement: effects of development and retardation’, in *Multidisciplinary Perspectives in Event-Related Potential*, ed. D.A. Otto (Washington DC: US Government Printing Office).
- Konttinen, N. and Lyytinen, H. (1993), ‘Brain slow waves preceding time-locked visuo-motor performance’, *Journal of Sport Sciences*, **11**, pp. 257–66.
- Libet, B. (1973), ‘Electrical stimulation of cortex in human subjects and conscious sensory aspects’, in *Handbook of Sensory Physiology*, ed. A. Iggo (Berlin: Springer Verlag).
- Libet, B., Gleason, C.A., Wright, E.W. and Pearl, D.K. (1983), ‘Time of conscious intention to act in relation to onset of cerebral activity (readiness potential): The unconscious initiation of a freely voluntary act’, *Brain*, **106**, pp. 623–42.
- Libet, B. (1985), ‘Unconscious cerebral initiative and the role of conscious will in voluntary action’, *Behavioral and Brain Sciences*, **8**, pp. 529–66.
- Libet, B. (1993), *Neurophysiology of Consciousness. Selected papers and new essays by Benjamin Libet* (Boston, MA: Birkhäuser).
- Libet, B. (1994), ‘A testable field theory of mind-brain interaction’, *Journal of Consciousness Studies*, **1** (1), pp. 119–26.
- Libet, B. (1996), ‘Neural processes in the production of conscious experience’, in *The Science of Consciousness*, ed. M. Velmans (London: Routledge).
- Libet, B. (1999), ‘Do we have free will?’ *Journal of Consciousness Studies*, **6** (8–9), pp. 47–57.
- Pepper, S.C. (1960), ‘A neural-identity theory of mind’, in *Dimensions of Mind*, ed. S. Hook (Washington Square, NYC: New York University Press).
- Sperry, R.W. (1980), ‘Mind–brain interaction: Mentalism yes; Dualism no’, *Neuroscience*, **5**, pp. 195–206.
- Velmans, M. (2002), ‘How could conscious experience affect brains?’, *Journal of Consciousness Studies*, **9** (11), pp. 3–29.